

# Instruction Manual

## SPUTTER

### Scancoat Six Sputter Coater

### Volume 1 - Installation and Maintenance Instructions

Description	Item Number
Scancoat Six Sputter Coater, 230 V, 1-phase, 50 Hz	E096-01-000
Scancoat Six Sputter Coater, 230 V, 1-phase, 60 Hz	E096-02-000

#### Supplementary Publications

R/V Rotary Vane Pumps	A652-01-880
Pirani Gauge Heads	D024-22-883
ISI16K Vacuum Interlock Switch	D059-14-880
Pirani 501/502	D395-02-880
IFVA10EK Air Admittance Valves	C417-01-885

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# Declaration of Conformity

We, **Edwards High Vacuum International,**  
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**West Sussex RH10 2LW, UK**

declare under our sole responsibility that the product(s)

Scancoat Six Sputter Coater (230 V, 50 Hz) E096-01-000  
 Scancoat Six Sputter Coater (115 V, 60 Hz) E096-02-000

to which this declaration relates is in conformity with the following standard(s)  
 or other normative document(s)

IEC1010-1 (1992) Safety Requirements for Electrical Equipment for Measurement,  
 Control and Laboratory Use.  
 EN50081-1 Electromagnetic Compatibility, General Emission Standard.  
 EN50082-1 Generic Standard Class: Domestic, Commercial & Light Industry.  
 Electromagnetic Compatibility, General Immunity Standard.  
 Generic Standard Class: Domestic, Commercial & Light Industry.

following the provisions of

73/023/EEC Low Voltage Directive.  
 89/336/EEC Electromagnetic Compatibility Directive.

*Oliver*  
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19/9/97 Crawley  
 Date and Place

**EDWARDS**

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**BOC EDWARDS**

## CONTENTS (Volume 1)

Section	Title	Page
1	INTRODUCTION	1
1.1	Scope and definitions	1
1.2	Description	1
1.3	Controls and indicators on the front panel	2
1.4	Connectors and controls on the rear panel	3
1.5	Safety devices	4
2	TECHNICAL DATA	6
2.1	Operating and storage conditions	6
2.2	Mechanical data	6
2.3	Components	6
2.4	Performance	6
2.5	Electrical data	7
2.6	Cooling-water and gas supplies	7
2.7	Connectors	7
3	INSTALLATION	8
3.1	Unpack and inspect	8
3.2	Locate and connect the Scancoat and rotary pump	9
3.3	Install the FTM6 film thickness monitor accessory (optional)	11
3.4	Install the Crystal Holder accessory (optional)	11
3.5	Install the Oscillator Unit (optional)	12
3.6	Install other accessories (optional)	12
3.7	Connect the cooling-water pipes to the Scancoat	12
3.8	Connect the process gas supply to the Scancoat	12
3.9	Connect a vent gas supply to the Scancoat (optional)	12
3.10	Connect the electrical supply to the Scancoat	13
4	MAINTENANCE	15
4.1	Safety	15
4.2	Maintenance plan	15
4.3	Inspect and clean the Scancoat	16
4.4	Inspect the pipelines and connections	17
4.5	Reset a circuit breaker	18
4.6	Fault finding	18
4.6.1	General	18
4.6.2	Causes of leaks	20
5	STORAGE AND DISPOSAL	21
5.1	Storage	21
5.2	Disposal	21

DBW 5982-00

Section	Title	Page
6	SERVICE, SPARES AND ACCESSORIES	22
6.1	Introduction	22
6.2	Service	22
6.3	Spares	22
6.4	Accessories	23
6.4.1	Carbon fibre evaporation accessory	23
6.4.2	Shutter accessory	23
6.4.3	Metallurgical sample holder	23
6.4.4	Oil mist filter	24
6.4.5	Film thickness monitor	24
6.4.6	Crystal Holder	24
6.4.7	Oscillator Unit and Connecting Cable	24

7	ENGINEERING DIAGRAMS	25
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#### RETURN OF BOC EDWARDS EQUIPMENT

### Illustrations

Figure	Title	Page
1	Front panel of the Scancoat	3
2	Rear panel of the Scancoat	5
3	Dimensions of the Scancoat Six cabinet (mm)	8
4	Use of the quick-fit connectors	13
5	Install the Crystal Holder	13
6	Scancoat chamber	17
7	Circuit diagram	26

### Tables

Table	Title	Page
1	Checklist of items	9
2	FTM6 electrical supply cable wires	11
3	Scancoat electrical supply cable wires	14
4	Maintenance plan	15
5	Fault finding	19
6	Possible causes of leaks	20

CONTENTS (Volume 2)

Section	Title	Page
1	INTRODUCTION	1
1.1	Scope and definitions	1
2	OPERATION	1
2.1	Introduction	1
2.1.1	Sequence of operation	1
2.1.2	Timer operation	2
2.1.3	Determine the optimum settings for your process	2
2.2	Replace or change the sputter target	4
2.3	Prepare the Scancoat	6
2.4	Coat SEM samples (with the timer)	8
2.5	Coat SEM samples (without the timer)	9
2.6	Sputter etch/clean samples	10
2.7	Coat metallurgical samples with interference films	10

Illustrations

Figure	Title	Page
1	Timer controls and displays	3
2	Scancoat controls and indicators	5
3	The Scancoat chamber	7

SECTION 3 : LIST OF SUBSTANCES IN CONTACT WITH THE EQUIPMENT

Substance name	Chemical symbol	Precautions required (for example, use protective gloves, etc.)	Action required after spillage or human contact
1			
2			
3			
4			
5			
6			

SECTION 4 : RETURN INFORMATION

Reason for return and symptoms of malfunction: \_\_\_\_\_

If you have a warranty claim: \_\_\_\_\_

- who did you buy the equipment from ? \_\_\_\_\_
- give the supplier's invoice number \_\_\_\_\_

SECTION 5 : DECLARATION

Print your name: \_\_\_\_\_

Print your organisation: \_\_\_\_\_

Print your address: \_\_\_\_\_

Telephone number: \_\_\_\_\_

Date of equipment delivery: \_\_\_\_\_

I have made reasonable enquiry and I have supplied accurate information in this Declaration. I have not withheld any information. I have followed the Return of BOC Edwards Equipment Procedure (HS1).

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

**Return of BOC Edwards Equipment - Declaration (Form HS2)**

Return Authorisation Number: \_\_\_\_\_

**You must:**

- Know about all of the substances which have been used and produced in the equipment before you complete this Declaration
- Read the Procedure (HS1) on the previous page before you attempt to complete this Declaration
- Contact your supplier to obtain a Return Authorisation Number and to obtain advice if you have any questions
- Send this form to your supplier before you return your equipment

**SECTION 1 : EQUIPMENT**

a. Equipment model \_\_\_\_\_

b. Serial Number \_\_\_\_\_

c. Has the equipment been used, tested or operated?

Yes ☐ Go to Section 2no ☐ Go to Section 4**FOR SEMICONDUCTOR APPLICATIONS ONLY :**

Tool Reference Number \_\_\_\_\_

Process \_\_\_\_\_

Failure Date \_\_\_\_\_

Serial Number of  
Replacement Equipment \_\_\_\_\_**SECTION 2 : SUBSTANCES IN CONTACT WITH THE EQUIPMENT**a. Radioactive yes ☐ no ☐b. Biologically active yes ☐ no ☐c. Dangerous to human health and safety? yes ☐ no ☐**If you have answered 'no' to all of these questions, go to Section 4.**

(Continued)

Your supplier will not accept delivery of any equipment that is contaminated with radioactive substances, unless you:

- Decontaminate the equipment
- Provide proof of decontamination

**YOU MUST CONTACT YOUR SUPPLIER FOR  
ADVICE BEFORE YOU RETURN SUCH EQUIPMENT**

# 1 INTRODUCTION

## 1.1 Scope and definitions

This manual is supplied in two volumes; Volume 1 provides installation and maintenance instructions for the BOC Edwards Scancoat Six Sputter Coater (abbreviated to Scancoat in the remainder of this manual). Volume 2 provides operating instructions. You must use the Scancoat as specified in this manual.

Read this Volume of the manual before you install and maintain the Scancoat. Important safety information is highlighted as WARNING instructions; you must obey these instructions. The use of WARNINGS is defined below.

### WARNING

Warnings are given where failure to observe the instruction could result in injury or death to people.

### CAUTIONS

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

The units used throughout this manual conform to the SI international system of units of measurement.

## 1.2 Description

The Scancoat is a compact bench-top sputter coater, designed to thinly coat samples for use in SEMs (scanning electron microscopes). The Scancoat is also suitable for the production of thin, optical films on metallurgical samples, for use in optical interference microscopy. The Scancoat will sputter coat thin, high quality metal films onto a wide range of sample materials. The films are deposited uniformly, even over re-entrant surfaces.

The Scancoat is a 'cool' sputter coater, and has the following design features which reduce heating effects in specimens which you coat, and so prevent damage to delicate specimens:

- The electrode has a 'virtual annulus' (a disk at earth (ground) potential), which suppresses high energy electrons produced in the plasma, which would heat the specimen.
- The electron deflection system reduces secondary electron bombardment of the specimens.
- The large diameter worktable reduces plasma density and is water-cooled and so acts as an effective heat sink.

The Scancoat is supplied with an RV3 rotary pump which you connect to the Scancoat cabinet, to evacuate the chamber. The baseplate of the Scancoat has an electrical leadthrough which allows you to connect a crystal holder accessory (see Section 6.4.7).

### 1.3 Controls and indicators on the front panel

Refer to Figure 1. The Scancoat has the following controls and indicators:

Vacuum gauge (1)	This shows the pressure inside the chamber.
Pump lamp (2)	This lamp is on when the pump is on.
Interlock lamp (3)	This lamp is on when the chamber is under vacuum.
HT current meter (4)	This shows the sputter current.
HT voltage meter (5)	This shows the sputter voltage.
Timer (6)	Use this to automatically control the process time. When the timer is used, the timer will switch off the HT supply at the end of the preset time. Refer to Volume 2 for more information.
Start switch (7)	Use this momentary-action switch to start the process (that is, switch on the HT electrical supply to the sputter source, start the timer and admit process gas into the chamber).
Pump/Vent switch (8)	This is a dual-position, latching switch. Move the switch to the Pump position to switch on the pump, and move the switch to the Vent position to switch off the pump and vent the chamber.
HT voltage adjuster (9)	Use this to adjust the sputter voltage.
Etch switch (10)	Use this latching switch to select or deselect sputter etch/clean mode. The lamp in the switch is on when etch/clean is selected.
HT circuit breaker switch (11)	Use this switch to reset the HT circuit breaker.
Power circuit breaker switch (12)	Use this switch to reset the Scancoat electrical supply circuit breaker.
Vent lamp (13)	This lamp is on when the chamber is being vented (and the pump is off).
Sputter lamp (14)	This lamp is on when the sputter process is in progress.
Gas flow lamp (15)	This lamp is on when process gas is being admitted to the chamber.

### Return of BOC Edwards Equipment - Procedure (Form HS1)

#### Introduction

Before you return your equipment you must warn your supplier if the substances you used (and produced) in the equipment can be dangerous. You must do this to comply with health and safety at work laws.

**You must complete the Declaration (HS2) on the next page and send it to your supplier before you dispatch the equipment.** If you do not, your supplier will assume that the equipment is dangerous and he will refuse to accept it. If the Declaration is not completed correctly, there may be a delay in processing your equipment.

#### Guidelines

Take note of the following guidelines:

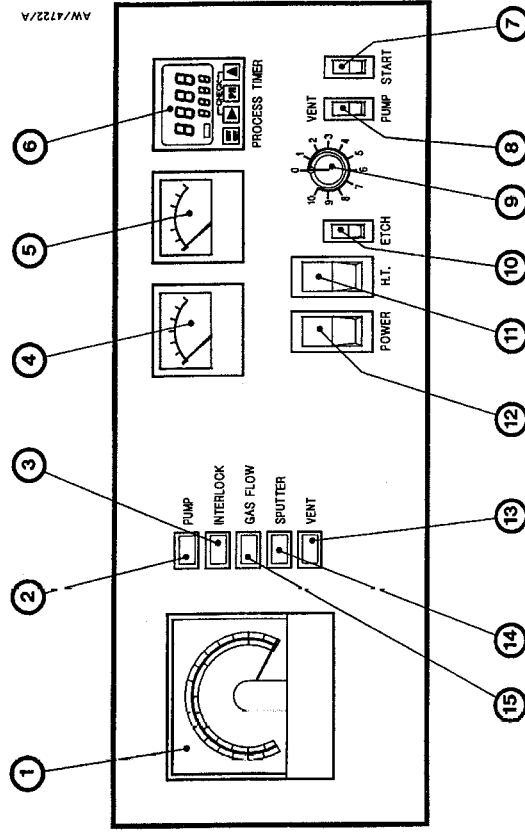
- Your equipment is 'uncontaminated' if it has not been used or if it has only been used with substances that are not dangerous. Your equipment is 'contaminated' if it has been used with any dangerous substances.
- If your equipment has been used with radioactive substances, you must decontaminate it before you return it to your supplier. You must send independent proof of decontamination (for example a certificate of analysis) to your supplier with the Declaration (HS2). Phone your supplier for advice.
- We recommend that contaminated equipment is transported in vehicles where the driver does not share the same air space as the equipment.

#### PROCEDURE

Use the following procedure:

- Contact your supplier and obtain a Return Authorisation Number for your equipment.
- Turn to the next page(s), photocopy and then complete the Declaration (HS2).
- Remove all traces of dangerous gases: Pass an inert gas through the equipment and any accessories which will be returned to your supplier. Drain all fluids and lubricants from the equipment and its accessories.
- Disconnect all accessories from the equipment. Safely dispose of the filter elements from any oil mist filters.
- Seal up all of the equipment's inlets and outlets (including those where accessories were attached). You may seal the inlets and outlets with blanking flanges or heavy gauge PVC tape.
- Seal contaminated equipment in a thick polythene bag. If you do not have a polythene bag large enough to contain the equipment, you can use a thick polythene sheet.
- If the equipment is large, strap the equipment and its accessories to a wooden pallet. Preferably, the pallet should be no larger than 510mm x 915mm (20" x 35"); contact your supplier if you cannot meet this requirement.
- If the equipment is too small to be strapped to a pallet, pack it in a suitable strong box.
- If the equipment is contaminated, label the pallet (or box) in accordance with laws covering the transport of dangerous substances.
- Fax or post a copy of the Declaration (HS2) to your supplier. The Declaration must arrive before the equipment.
- Give a copy of the Declaration to the carrier. You must tell the carrier if the equipment is contaminated.
- Seal the original Declaration in a suitable envelope; attach the envelope securely to the outside of the equipment package. **WRITE YOUR RETURN AUTHORISATION NUMBER CLEARLY ON THE OUTSIDE OF THE ENVELOPE OR ON THE OUTSIDE OF THE EQUIPMENT PACKAGE.**





- |                     |                                  |
|---------------------|----------------------------------|
| 1. Vacuum gauge     | 9. Voltage adjuster              |
| 2. Pump lamp        | 10. Etch switch                  |
| 3. Interlock lamp   | 11. HT circuit breaker switch    |
| 4. HT current meter | 12. Power circuit breaker switch |
| 5. HT voltage meter | 13. Vent lamp                    |
| 6. Timer            | 14. Sputter lamp                 |
| 7. Start switch     | 15. Gas flow lamp                |
| 8. Pump/Vent switch |                                  |

Figure 1 - Front panel of the Scancoat

## 1.4 Connectors and controls on the rear panel

Refer to Figure 2. The rear panel of the Scancoat has the following connectors and control:

- |  |  |
|--|--|
| Pump electrical connector (1)            | Use this to connect the rotary pump electrical supply cable to the Scancoat: refer to Section 3.2.                               |
| Power electrical connector (2)           | Use this to connect your external electrical supply to the Scancoat: refer to Section 3.10.                                      |
| Process gas control valve (3)            | Use this to control the flow rate of process gas into the chamber, and so adjust the pressure in the chamber: refer to Volume 2. |
| Process gas inlet (4)                    | Use this to connect your process gas supply pipeline to the Scancoat: refer to Section 3.8.                                      |
| Chamber vent inlet (5)                   | If required, use this to connect a vent gas supply to the Scancoat: refer to Section 3.9.  |
| Film monitor connector (6)               | Use this to connect a film thickness monitor accessory to the Scancoat: refer to Sections 3.3 to 3.5.                            |
| Vacuum pump connector (7)                | Use this to connect the vacuum pipe (from the vacuum pump) to the Scancoat: refer to Section 3.2.                                |
| Water outlet and inlet connectors (8, 9) | Use these to connect your cooling-water return and supply pipelines to the Scancoat: refer to Section 3.7.                       |

## 1.5 Safety devices

The Scancoat has the following safety devices which prevent dangerous operation of the Scancoat:

- |                       |  |
|-----------------------|--|
| Power circuit breaker | This circuit breaker trips to switch off the electrical supply when excessive electrical current is demanded by the Scancoat. When the circuit breaker trips, the Power circuit breaker switch (Figure 1, item 12) automatically reverts to the 'off' position. Refer to Section 4.5 to reset the circuit breaker. |
| HT circuit breaker    | This circuit breaker trips to switch off the HT electrical supply when excessive HT current is demanded. When the circuit breaker trips, the HT circuit breaker switch (Figure 1, item 11) automatically reverts to the 'off' position. Refer to Section 4.5 to reset the circuit breaker.                         |
| Chamber microswitch   | This microswitch operates to switch off the HT electrical supply when the chamber lid is open.   |

10. When the chamber has been vented and the pump stopped, open the chamber lid and remove the cleaned specimens.

## 2.7 Coat metallurgical samples with interference films

### WARNING

Observe all necessary safety precautions when you use oxygen in the Scancoat. If you do not, there is a risk of fire or explosion.

*Notes: Iron targets are available as spares: refer to Volume 1.*

*We recommend that you use a sputter to prevent contamination of the target.*

Use the following procedure to coat metallurgical samples with iron oxide interference films.

1. Remove the gold target and copper backing electrode and fit a 21 iron target: refer to Section 2.2.
2. Place the mounted samples on the specimen holder (or in the metallurgical sample holder, if fitted).
3. Ensure that an oxygen supply is connected to the Scancoat process gas inlet: refer to Volume 1.
4. Close the shutter, then sputter clean the samples for two or three minutes: use the procedure in Steps 1 to 9 of Section 2.6.
5. Press the Etch switch (10) and ensure that the lamp in the switch goes off.
6. Open the shutter, then start deposition at a low rate to prevent heat damage to the sample mounts:
  - Set the HT voltage control (9) to the required voltage.
  - Set the timer (6) to a long delay, to allow you to manually control the process: refer to Section 2.1.2.
  - Press the Start switch (7) to start the deposition process.
7. When an interference film of the correct colour is obtained (usually at the first magenta), stop the process and remove the samples: refer to Steps 9 and 10 of Section 2.6.

## Coat SEM samples (without the timer)

To coat SEM samples and to manually control the coating time, use the procedure in Section 2.4, but with the following changes:

- In Step 7, set the timer (6) to a long process time, for example 300 seconds; this enables manual coating to be achieved.
- To stop coating and leave the chamber under vacuum, press the Reset button on the timer (Figure 1, item 6).
- To stop coating and to vent the chamber at the same time, move the Pump/Vent switch (8) to the 'vent' position.

## Sputter etch/clean samples

### WARNING

When you open the chamber lid, ensure that it cannot fall and injure you.

*Note: We recommend that you use a shutter when you etch/clean, to prevent target contamination.*

Use the following procedure to sputter etch or clean conducting samples:

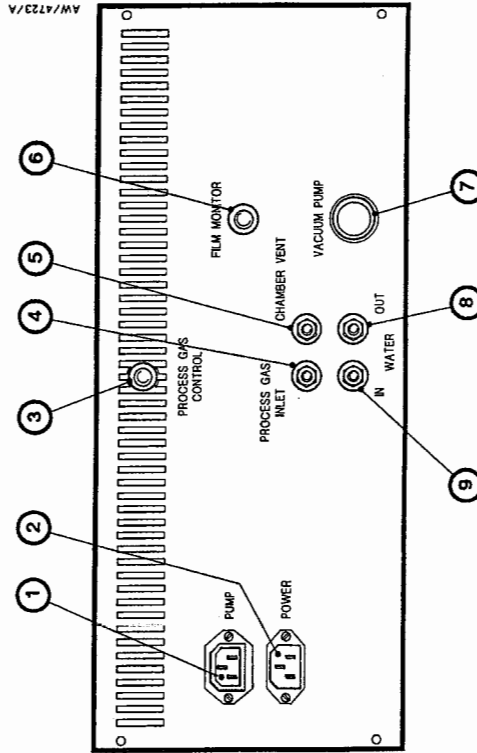
1. Refer to Figure 2. Switch on the electrical supply to the Scancoat, then move the Pump/Vent switch (8) to the 'pump' position to start the rotary pump.
2. Wait until the pressure in the chamber is  $1 \times 10^{-1}$  mbar or less.
3. Set the HT voltage control (9) to the '0' position.
4. Set the timer to the required etch/clean time: refer to Section 2.1.2.
5. Press the Etch switch (10) and ensure that the lamp in the switch is on.
6. Press the Start switch (7) to switch on the HT supply to the sputter source.
7. Adjust the HT voltage control (9) to select the required voltage.
8. Ensure that the required current is shown on the HT current meter (4). If necessary, adjust the HT voltage control (9) to obtain the required current.
9. The timer will automatically stop the etch/clean process after the preset process time has elapsed. If required, you can stop the etch/clean process before the preset process time has elapsed:
  - To stop the etch/clean process only, press the Reset button on the timer (Figure 1, item 6).
  - To stop the etch/clean process and to vent the chamber and stop the pump, move the Pump/Vent switch (8) to the 'vent' position.

Vacuum interlock switch

This switch ensures that the HT electrical supply is isolated from the chamber when the pressure in the chamber is above the correct process pressure.

Rotary vacuum pump thermal trip switch

This switch operates to switch off the rotary vacuum pump when the pump-motor windings overheat. Refer to the pump instruction manual to reset the thermal trip switch.



1. Pump electrical connector
2. Power electrical connector
3. Process gas control valve
4. Process gas inlet
5. Chamber vent inlet
6. Film monitor connector
7. Vacuum pump connector
8. Cooling-water outlet
9. Cooling-water inlet

Figure 2 - Rear panel of the Scancoat

## 2 TECHNICAL DATA

*Note: Refer to the Supplementary Publications for technical data for components of the Scancoat (for example, the rotary vacuum pump and Pirani gauge heads).*

### 2.1 Operating and storage conditions

Ambient operating temperature range	5 to 40 °C
Ambient storage temperature range	1 to 50 °C
Ambient operating humidity range	80% RH up to 31 °C, 50% RH at 40 °C
Usage category	For indoor use only
Pollution category	2
Installation category	2

### 2.2 Mechanical data

Cabinet dimensions	See Figure 3
Mass of cabinet (without pump)	22 kg
Workchamber dimensions (mm)	Ø150 x 115 high
Workable diameter	100 mm
Workable fixing hole diameters (six of each)	3.2, 10.2 and 15.2 mm
(Gold) target dimensions (mm)	Ø60 x 0.1 thick

### 2.3 Components

Vacuum pump	BOC Edwards RV3 Rotary Vane Pump
Pressure gauge	BOC Edwards Pirani 501, scaled 5 to 10 <sup>-3</sup> mbar
Pressure gauge head	BOC Edwards Pirani PRE10K
Target supplied	Gold
Workchamber	Borosilicate glass
Workable	Copper (water-cooled)
Timer	
Manufacturer, type	Crouzet, digital
Time range	0 secs to 999.9 secs

### 2.4 Performance

Time to reduce chamber pressure	< 50 s
To 1.3 x 10 <sup>-1</sup> mbar (13 Pa)	
To 6 x 10 <sup>-2</sup> mbar (6 Pa)	< 3 min
Sputtering rate	Up to 60 nm.min <sup>-1</sup>
HT electrical supply	1500 V d.c. at 50 mA

### 2.4

#### Coat SEM samples (with the timer)

##### WARNING

When you open the chamber lid, ensure that it cannot fall and injure you.

##### WARNING

Ensure that you do not trap your fingers if you adjust the cathode height when the chamber is below atmospheric pressure.

*Note: At a current setting of 40 mA and a target to substrate distance of 30 mm, the deposition rate is approximately 15 nm.min<sup>-1</sup>.*

Use the following procedure to coat SEM samples and to use the timer to automatically control the coating time.

1. Switch on the electrical supply to the Scancoat.
2. Refer to Figure 2. Ensure that the circuit breaker switches (11, 12) are both in the 'on' position. If necessary, move the switches to the 'on' position to reset the circuit breakers.
3. Move the Pump/Vent switch (8) to the 'pump' position to start the rotary pump.
4. Wait until the pressure in the chamber is 1 x 10<sup>-1</sup> mbar or less.
5. Ensure that the lamp in the Etch switch (10) is off; if the lamp is on, press the switch to turn the lamp off.
6. Set the HT voltage control (9) to the required voltage.
7. Set the timer (6) to the required coating time; refer to Section 2.1.2.
8. Press the Start switch (7). The Scancoat will then allow process gas into the chamber and switch on the HT supply to the sputter source, to start the coating.
9. Ensure that the required current is shown on the HT current meter (4). If necessary, adjust the HT voltage control (9) to obtain the required current.
10. When the preset time set on the timer has elapsed, the HT supply is switched off and coating stops.
11. Move the Pump/Vent switch (8) to the 'vent' position to stop the pump and to vent the chamber.
12. Refer to Figure 3. Open the chamber lid (1) and remove the coated specimens.

8. Refit the centre screen (13) and loosely secure with the two screws (12).

9. Adjust the position of the centre screen, so that the gap between the anode and the target and cathode assembly is 1 to 2 mm., then tighten the two screws (12) to secure the anode.

### 2.3 Prepare the Scancoat

<p><b>WARNING</b></p> <p>When you open the chamber lid, ensure that it cannot fall and injure you.</p>
<p><b>WARNING</b></p> <p>Never operate the Scancoat when the implosion guard is not fitted. If you do, and the chamber breaks, you may be injured.</p>
<p><b>WARNING</b></p> <p>Do not use toxic or corrosive gases in the Scancoat.</p>
<p><b>CAUTION</b></p> <p>Wear clean, lint-free gloves when you handle your samples. If you do not, you can contaminate the samples and they will not be properly coated.</p>

Use the following procedure to prepare the chamber for your process.

1. Refer to Figure 3. Open the chamber lid (1).
2. If required, change the target (see Section 2.2).
3. Load the specimens into the specimen holder (20), then place the specimen holder onto the worktable (19).
4. Close the chamber lid (1).
5. If required, loosen the collar clamp (3) and lower or raise the cathode tube so that the cathode (10) and target (11) are the required distance above the specimens (20); if necessary, twist the tube slightly so that it is easier to move up or down. When the cathode and target are in the correct position, tighten the collar clamp (3) to secure the cathode tube in place.
6. Ensure that the cooling-water supply, the process gas supply (and the vent gas supply, if required) are switched on and at the correct pressures (refer to Volume 1).
7. Ensure that the implosion guard (25) is in place.

### 2.5 Electrical data

Electrical supply	115 V, 60 Hz or 230 V, 50 Hz
Nominal voltage and frequency	±10%
Voltage tolerance	3750 V/A
Maximum electrical power (starting)	800 V/A
Maximum electrical power (operating)	115 V 230 V
Circuit breaker ratings	8 A 5 A
Power circuit breaker (CB1)	1 A 0.6 A
HT circuit breaker (CB2)	
HT supply	
Voltage	0 to 2.0 kV
Current	0 to 50 mA
Current meter	0 to 100 mA, with overload protection
Voltage meter	0 to 2500 V

### 2.6 Cooling-water and gas supplies

Cooling-water supply	
Maximum temperature	15 °C
Maximum pressure	30 psi (2 bar)
Flow rate	0.5 l.min <sup>-1</sup>
Process gas supply	
Type	Argon or other dry, inert gas *
Maximum pressure	1.1 bar, 1.1 x 10 <sup>5</sup> Pa, 16 psi
Vent gas supply (optional)	
Type	Nitrogen or other dry, inert gas
Maximum pressure	1.1 bar, 1.1 x 10 <sup>5</sup> Pa, 16 psi

### 2.7 Connectors

Electrical supply socket	IEC 320
Cooling-water inlet and outlet	Quick-fit connection for 4 mm o.d. tube
Process gas inlet	Quick-fit connection for 6 mm o.d. tube
Vent gas inlet	Quick-fit connection for 6 mm o.d. tube
Vacuum outlet (to pump)	Suitable for 1 inch o.d. pipe
Pump outlet	NW25

\* Oxygen may be used when you coat metallurgical samples with interference films; see Volume 2. If you use oxygen, the pump oil must be fomblinised to prevent explosion: refer to the pump instruction manual for more information.

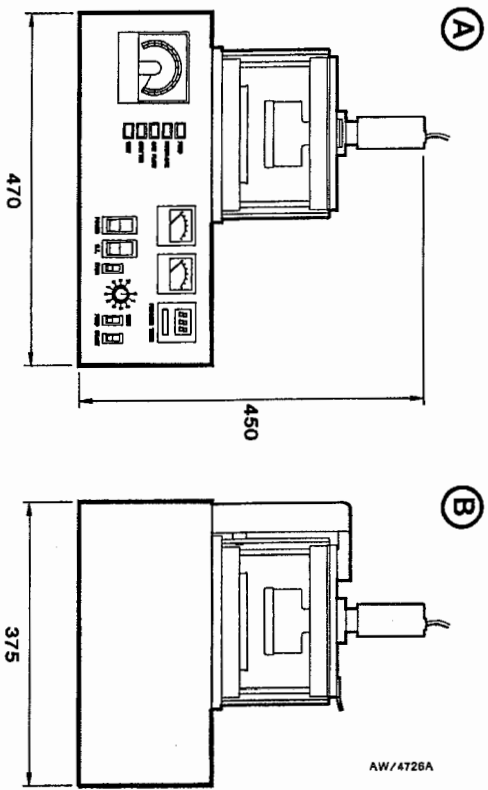


Figure 3 - Dimensions of the Scancoat Six cabinet (mm)

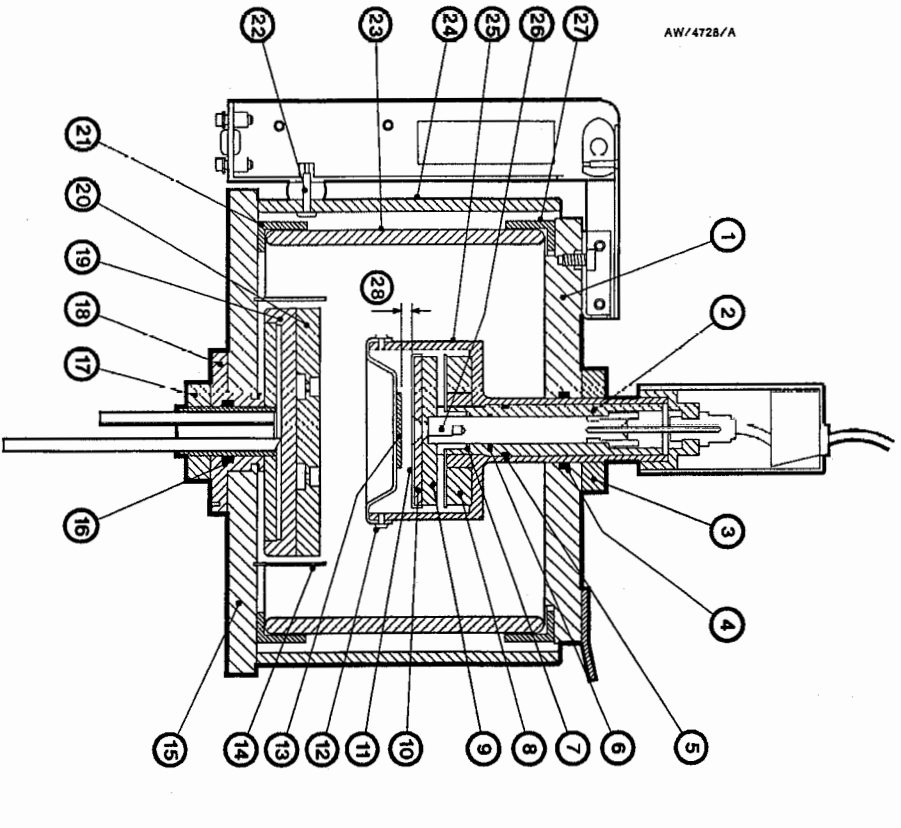


Figure 3 - The Scancoat chamber

## Replace or change the sputter target

### WARNING

When you open the chamber lid, ensure that it cannot fall and injure you.

### WARNING

The electrode shield and the electrode can get very hot after extended use. Ensure that you allow the electrode shield and the electrode to cool to a safe temperature before you touch them.

### CAUTION

Wear clean, lint-free gloves when you replace or change the target. If you do not, you will contaminate the target and your samples will not be properly coated.

### CAUTION

Ensure that target foil does not touch the electrode. If it does, a short circuit will occur and the Scancoat may be damaged.

*Notes: If required, you can use solid targets instead of target foil wrapped around the cathode.*

The Scancoat is supplied with a gold target. When required, use the following procedure to replace the sputter target.

1. Refer to Figure 3. Open the chamber lid (1).
2. If necessary, allow the electrode shield and the electrode to cool to a safe enough temperature to touch. After extended operation these can get very hot, as follows:
  - After 4 minutes operation - centre screen: 77 °C; shield: 42 °C.
  - After 10 minutes operation - centre screen: 140 °C; shield: 70 °C
3. Undo and remove the two screws (12), then remove the centre screen (13).
4. Undo and remove the counter-sunk screw (27), then remove the target (11) and cathode (10).
5. Remove the old target foil from the cathode.
6. Wrap new precious metal target foil around the cathode (10). Ensure that the foil is smooth against the two faces of the cathode, and ensure that foil does not touch the electrode, otherwise a short circuit will be caused.
7. Use the counter-sunk screw (27) to secure the cathode (10) and target to the electrode assembly (26).

(Continued on page 8)

## 3 INSTALLATION

### 3.1 Unpack and inspect

#### WARNING

Use suitable lifting equipment, or get someone to help you move the Scancoat. The Scancoat is heavy and may cause injury or be damaged if it is dropped. Refer to Section 2 for the mass of the Scancoat.

1. Remove all packing materials and protective covers and check the Scancoat, the rotary pump and the other equipment supplied. If any item is damaged, notify your supplier and the carrier in writing within three days; state the Item Number of the Scancoat, together with your order number and your supplier's invoice number. Retain all packing materials for inspection. Do not install and use the Scancoat if any item is damaged.
2. Check that you have received the items listed in Table 1. If any item is missing, notify your supplier in writing within three days.
3. Check that the Scancoat is suitable for use with your electrical supply. If the Scancoat is not suitable for use with your electrical supply, do not continue to install or use the Scancoat.
4. Check the sealing faces of the chamber. Do not continue to install and use the Scancoat if the sealing faces are damaged.
5. If the Scancoat is not to be used immediately, replace the protective covers and store in suitable conditions, as described in Section 5.
6. Refer to Figure 6, item 15. Into each of the four holes in the baseplate fit one of the push fit gauze filters provided.

Qty	Description	Check (3)
1	Scancoat cabinet	o
1	Electrical supply cable	o
1	RV3 rotary vane pump	o
1	Pump electrical supply cable	o
1	Vacuum pipe (0.8 m long)	o
2	Hose clips	o
1	Hose adaptor	o
1	NW25 clamp	o
1	Canister of rotary pump oil	o
1	Glass chamber	o
1	Shield ring	o
1	Specimen holder	o
1	Carbon Fibre (3.0m long)	o
4	Push fit filter	o

Table 1 - Checklist of items

### 3.2 Locate and connect the Scancoat and rotary pump

#### WARNING

Use suitable lifting equipment, or get someone to help you move the Scancoat. The Scancoat is heavy and may cause injury or be damaged if it is dropped. Refer to Section 2 for the mass of the Scancoat.

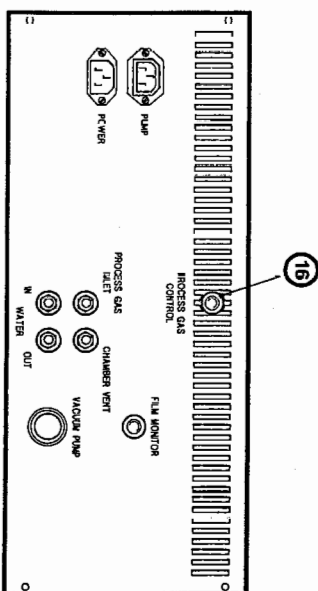
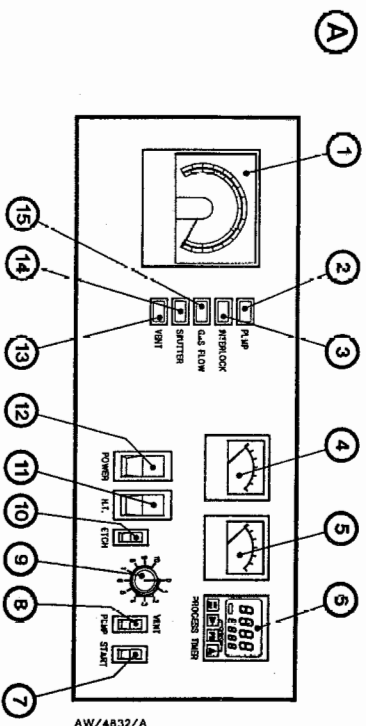
*Note: When you move the Scancoat, ensure that you do not drop or damage the chamber glass; the chamber glass is not secured to any other part of the Scancoat.*

When you locate the Scancoat and the rotary pump, ensure that:

- There is enough space above the Scancoat for you to open the chamber lid and access the inside of the chamber.
- There is enough space behind the Scancoat so that you can access the connectors, and so that there is enough space for cables and pipelines to be fitted to the connectors.
- There is enough space around the rotary pump for you to access the oil filler plug, drain plug and sight-glass (refer to the pump instruction manual).
- The rotary pump is close enough for the electrical supply cable and the vacuum pipe to reach the Scancoat.

Use the following procedure to locate the Scancoat and the rotary pump. Where necessary, refer to the pump instruction manual.

1. Use suitable lifting equipment or get help from someone else to help you move the Scancoat into its required operating position (for example, on a bench top).
2. Use suitable lifting equipment or get help from someone else to help you lift the pump into its required operating position.
3. Use the hose adaptor and one of the hose clips supplied to connect one end of the vacuum pipe to the pump inlet.
4. Refer to Figure 2. Fit the other end of the vacuum pipe to the vacuum pump connector (7) on the rear panel of the Scancoat, and secure with the other hose clip supplied.
5. Fit the connector on one end of the rotary pump electrical supply cable to the pump electrical connector (1) on the rear of the Scancoat.
6. Fit the connector on the other end of the cable to the pump electrical inlet connector.
7. Connect suitable hose to the rotary pump outlet and connect the other end of the hose to your exhaust-extraction system (refer to the pump instruction manual). Alternatively, fit an oil mist filter accessory (see Section 7.4) to the rotary pump outlet.
8. Fill the rotary vacuum pump with oil: refer to the pump instruction manual.



- |   |                  |    |                              |
|---|------------------|----|------------------------------|
| A | Front panel      | 11 | HT circuit breaker switch    |
| B | Rear panel       | 12 | Power circuit breaker switch |
| 1 | Vacuum gauge     | 13 | Vent lamp                    |
| 2 | Pump lamp        | 14 | Sputter lamp                 |
| 3 | Interlock lamp   | 15 | Gas flow lamp                |
| 4 | HT current meter | 16 | Process gas control valve    |
| 5 | HT voltage meter |    |                              |

Figure 2 - Scancoat controls and indicators



### Determine the optimum settings for your process

#### WARNING

Never operate the Scancoat when the implosion guard is not fitted. If you do, and the chamber breaks, you may be injured.

If the Scancoat has just been installed, we recommend that you use the Scancoat to coat or etch/clean 'scrap' (unwanted) samples, in order to determine the optimum settings for your process. You can then adjust the Scancoat to give repeatable results when you process further samples.

Use the following procedure:

1. Prepare the Scancoat as described in Section 2.3.
2. Refer to Figure 2. Switch on the electrical supply to the Scancoat, and ensure that the Power circuit breaker switch (12) is in the 'on' position. If necessary, move the switch to the 'on' position to reset the circuit breakers.
3. Ensure that the HT circuit breaker switch (11) is in the 'off' position (to prevent the switch-on of the HT supply); if necessary, move the switch to the 'off'.
4. Move the Pump/Vent switch (8) to the 'pump' position to start the rotary pump
5. Wait until the pressure in the chamber is  $1 \times 10^{-1}$  mbar or less.
6. Set the time: (6) to a long process time (for example, 300 seconds); refer to Section 2.1.2.
7. Press the Start switch (7). The Scancoat will then allow process gas into the chamber.
8. Allow the chamber pressure to stabilise.
9. Adjust the process gas control valve (16) so that the pressure in the chamber is approximately  $3 \times 10^{-1}$  mbar.
10. Move the P.T.M./Vent switch (8) to the 'vent' position to stop the flow of process gas into the chamber.
11. Do a test process on samples as described in Sections 2.3 to 2.7, as required. Take a note of the required sputter voltage and process time.
12. Repeat Step 11 as required, to determine the optimum sputter voltage and process time for your process(es).

### 3.3

#### Install the FTM6 film thickness monitor accessory (optional)

The FTM6 film thickness monitor and oscillator unit is referred to as the FTM6 in the remainder of this section. Use the following procedure to install the FTM6; where necessary, refer to the instruction manual supplied with the FTM6.

1. Place the FTM6 on the top of the Scancoat cabinet, to the right of the vacuum chamber, or place the accessory next to the Scancoat cabinet.
2. Ensure that the voltage indicator on the FTM6 is set to the correct voltage for your electrical supply. If it is not correctly set, refer to the FTM6 instruction manual to configure the electrical supply.
3. Ensure that the external electrical supply is off and that the on/off switch on the FTM6 is in the off position.
4. Fit the IEC connector on the end of the electrical supply cable to the IEC connector on the rear of the FTM6.
5. Connect the other end of the electrical supply cable to a suitably fused and protected electrical supply and a suitable earth (ground) point. The wires in the cable are colour coded as shown in Table 2.
6. Install the oscillator as described in Section 3.5.

Colour	Use
Brown or black	Live
Blue or white	Neutral
Green and yellow	Earth (ground)

Table 2 - FTM6 electrical supply cable wires

### 3.4 Install the Crystal Holder accessory (optional)

Use the following procedure to install the Crystal Holder accessory.

1. Refer to Figure 6. Open the chamber lid (1).
2. Refer to Figure 5. Fit the bracket (3) over the shield ring (5), next to the electrical socket (8) on the baseplate (7).
3. Fit the plug (9) on the end of the cable (10) to the electrical socket (8) on the baseplate (7).
4. Fit the plug (1) at the other end of the cable to the socket in the crystal holder (2).
5. Install the oscillator accessory as described in Section 3.5.

### 3.5 Install the Oscillator Unit (optional)

Use the following procedure to connect the Oscillator Unit between the Crystal Holder accessory and the film thickness monitor (for example, the FTM6); where necessary, refer to the instruction manuals supplied with the Crystal Holder accessory and your film thickness monitor accessory.

1. Ensure that the Oscillator Unit is correctly orientated.
2. Connect the short coaxial cable from the 'Xtal' connector on the oscillator unit to the film monitor connector (Figure 2, item 6) on the rear of the Scancoat.
3. Connect the long coaxial cable from the FTM6 connector on the oscillator unit to the crystal connector on the FTM6.

### 3.6 Install other accessories (optional)

Install any other accessories (such as the Carbon Fibre Evaporation Accessory) as described in the instruction manuals supplied with the accessories.

### 3.7 Connect the cooling-water pipes to the Scancoat

*Note: We recommend that you incorporate an isolation-valve in the cooling-water supply pipeline so that you can switch off the supply when required.*

Connect your cooling-water supply and return pipelines to the Scancoat as described below. The cooling-water inlet and outlet on the Scancoat are of the 'quick-fit' type (see Figure 4). Fit 4 mm outside diameter pipelines directly to the inlet and outlet.

1. Refer to Figure 2. Connect your cooling-water supply pipeline to the cooling-water inlet (9).
2. Connect your cooling-water return pipeline to the cooling-water outlet (8).
3. Connect the other end of the cooling-water return pipeline to a suitable drain or water return system.

### 3.8 Connect the process gas supply to the Scancoat

*Note: Your process gas must be dry and must not exceed the pressure specified in Section 2.6.*

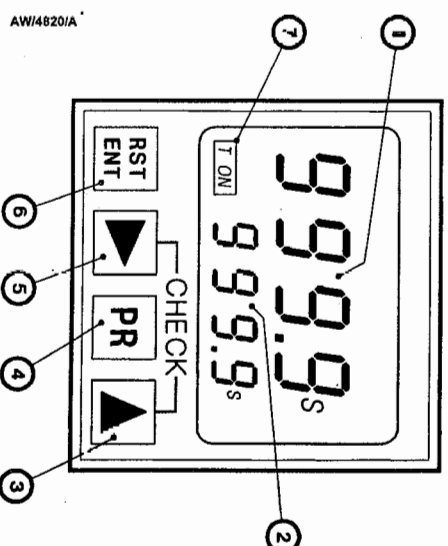
The process gas inlet on the Scancoat is of the 'quick-fit' type (see Figure 4). Fit a 6 mm outside diameter gas pipeline directly to the process gas inlet (Figure 2, item 5); connect the other end of the pipeline to your process gas supply.

### 3.9 Connect a vent gas supply to the Scancoat (optional)

*Note: Your vent gas must be dry and must not exceed the pressure specified in Section 2.6.*

The chamber vent inlet on the Scancoat is of the 'quick-fit' type (see Figure 4). If required, fit a 6 mm outside diameter gas pipeline directly to the chamber vent inlet (Figure 2, item 5), and connect the other end of the pipeline to your vent gas supply.

6. Set the fourth digit to the required value; use the procedure in Steps 2 and 3.
7. When the process time shown in the preset time display is correct, press the Enter button (6) to enter the process time into the timer.



1. Current timer display
2. Preset timer display
3. Increase button
4. Program button
5. Next button
6. Enter button
7. Timer On LED

Figure 1 - Timer controls and displays

## 2.1.1 Sequence of operation

Before you use the Scancoat to coat or etch/clean samples, we recommend that you determine the optimum settings for your process: use the procedure in Section 2.1.3.

When you want to change or replace the target, use the procedure in Section 2.2.

When you want to use the Scancoat, prepare the chamber as described in Section 2.3, then:

- If you want to coat SEM samples (with the timer), refer to Section 2.4.
- If you want to coat SEM samples (without the timer), refer to Section 2.5.
- If you want to sputter etch/clean samples, refer to Section 2.6.
- If you want to coat metallurgical samples with interference films, refer to Section 2.7.

If you want to use the timer to control your process, refer to Section 2.1.2.

## 2.1.2 Timer operation

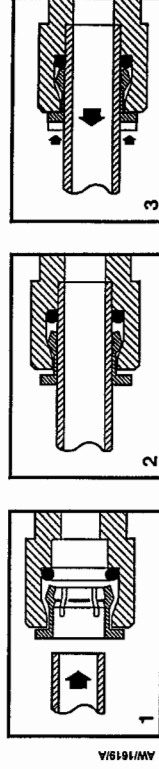
Refer to Figure 1. The timer has a preset timer display (2) and a current timer display (1). Each of these can show a time in seconds. When you want to use the timer to control a deposition or etch/clean process, you must enter the required process time into the timer, as described below.

When you then use the timer (see Sections 2.3 to 2.7):

- The preset timer display (2) shows the preset process time that you have entered into the timer.
- During the process, the Timer On LED (7) is on, and the current timer display (1) will count up from 000.0 s (zero seconds) to the preset process time.
- When the current timer display reaches the preset process time, the Timer On LED goes off, and the process is automatically stopped (that is, the timer switches off the HT supply and the process gas).

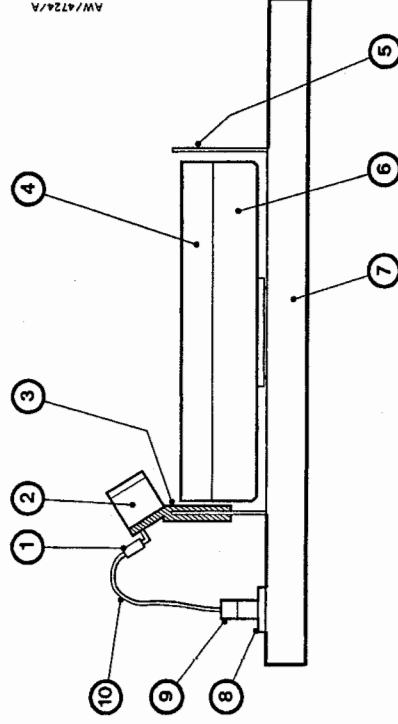
When required, refer to Figure 1 and use the following procedure to enter a process time into the timer.

1. Press the Program button (4). The first (left-hand) digit on the preset timer display (2) will then flash.
2. Use the Increase button (3) to set the digit to the required value; each time you press the button, the digit is increased by one.
3. When the digit is set to the required value, press the Next button (5); the second digit on the display will then flash.
4. Set the second digit to the required value: use the procedure in Steps 2 and 3.
5. Set the third digit to the required value: use the procedure in Steps 2 and 3.



1. Connect a pipe
2. Pipe fitted
3. Disconnect a pipe

Figure 4 - Use of the quick-fit connectors



- |                    |                      |
|--------------------|----------------------|
| 1. Plug            | 6. Worktable         |
| 2. Crystal holder  | 7. Baseplate         |
| 3. Bracket         | 8. Electrical socket |
| 4. Specimen holder | 9. Electrical plug   |
| 5. Shield ring     | 10. Cable            |

Figure 5 - Install the Crystal Holder

Connect the electrical supply to the Scancoat

WARNING

Ensure that the electrical installation of the Scancoat conforms with your local and national safety requirements. It must be connected to a suitably fused and protected electrical supply and a suitable earth (ground) point.

The electrical supply cable is supplied with a moulded IEC connector at one end, to fit the IEC socket on the rear of the Scancoat. The other end of the cable may have a plug suitable for your local electrical supply. A cable without a plug has wires colour coded as shown in Table 3.

Colour	Use
Brown or black	Live
Blue or white	Neutral
Green and yellow	Earth (ground)

Table 3 - Scancoat electrical supply cable wires

Use the following procedure to connect the electrical supply to the Scancoat.

1. Refer to Figure 1. Ensure that the external electrical supply is off and that the Scancoat Power circuit breaker switch (12) is in the off position.
2. Refer to Figure 2. Fit the moulded IEC connector on one end of the electrical supply cable to the electrical supply socket (2) on the rear of the Scancoat.
3. Connect the plug (if fitted) on the other end of the cable to your electrical supply. If the cable does not have a plug, connect the wires in the cable to the correct terminals of your electrical supply.

1

INTRODUCTION

1.1

Scope and definitions

This manual is supplied in two volumes; Volume 1 provides installation and maintenance instructions for the BOC Edwards Scancoat Six Sputter Coater (abbreviated to Scancoat in the remainder of this manual). Volume 2 provides operating instructions. You must use the Scancoat as specified in this manual.

Read this Volume of the manual, before you use the Scancoat. Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS is defined below.

WARNING

Warnings are given where failure to observe the instruction could result in injury or death to people.

CAUTION

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

2

OPERATION

2.1

Introduction

CAUTION

Do not operate the Scancoat continuously for more than 15 minutes. If you do, you may damage the Scancoat.

The Scancoat is designed to deposit thin films on samples; you must not use the Scancoat to deposit a thick film in one continuous operation. If you operate the Scancoat continuously for more than 15 minutes, the high temperature rise in the electrode may damage the insulators and seals in the Scancoat.

## 4 MAINTENANCE

### 4.1 Safety

#### WARNING

Obey the safety instructions given below and take note of appropriate precautions. If you do not, you can cause injury to people and damage to equipment.

- A suitably trained technician must maintain the Scancoat.
- Switch off the Scancoat and disconnect it from the electrical supply before you start maintenance.
- Surfaces inside the chamber can get very hot. Allow the Scancoat to cool to a safe temperature before you start work.

### 4.2 Maintenance plan

The plan shown in Table 4 details the operations necessary to maintain the Scancoat in normal operation. Instructions for each operation are given in the sections shown.

Operation	Frequency	Refer to Section
Inspect and clean the Scancoat	After use	4.3
Inspect the pipelines and connections	Monthly	4.4
Check the rotary pump oil level	Monthly	*
Change the rotary pump oil	Every 3000 hours	*
Inspect and change the sputter target	When necessary	Volume 2
Reset a circuit breaker	When necessary	4.5

\* Refer to the rotary vacuum pump instruction manual.

Table 4 - Maintenance plan

## 4.3 Inspect and clean the Scancoat

### CAUTION

Do not use wire wool to clean the chamber. If you do, the fine wires may break off and damage the Scancoat.

Use the following procedure to inspect and clean the Scancoat. Where necessary, refer to the instruction manuals supplied with any accessories you have installed in the chamber.

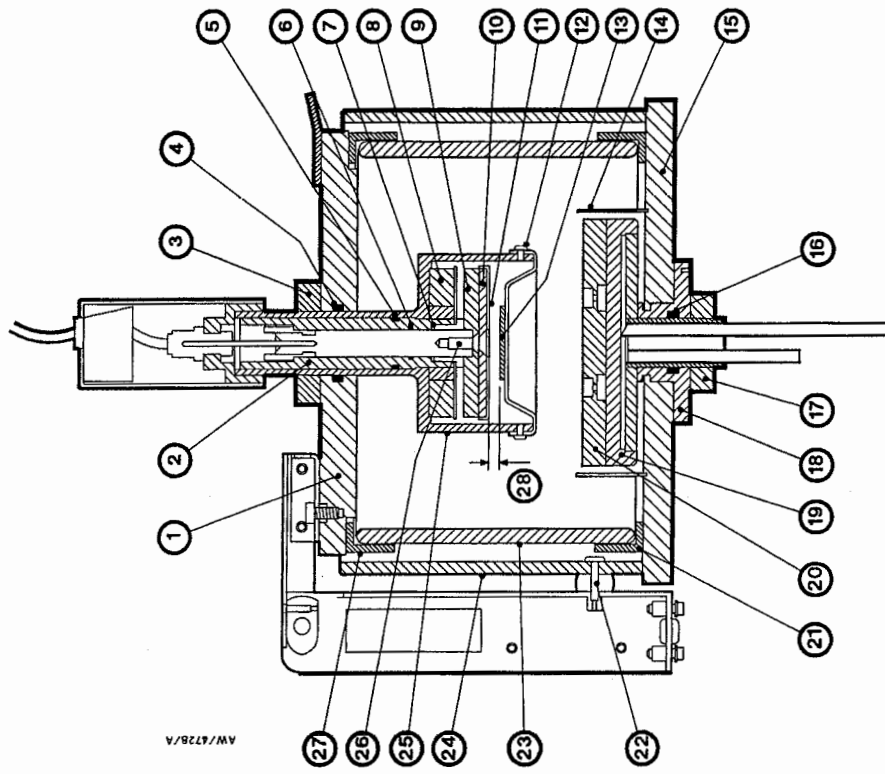
1. Refer to Figure 6. Open the chamber lid (1).
2. Remove the chamber glass (23) from the baseplate (15).
3. Remove the gaskets (21, 27) from the chamber glass.
4. Inspect the chamber glass. If it is cracked or chipped, you must replace it.
5. If the chamber glass is not damaged, clean it. Use a soft, lint-free cloth dampened with isopropyl or ethyl alcohol to wipe off soft deposits. If necessary, use fine-grade emery cloth to remove harder deposits.
6. Remove the retaining screw (22) and then remove the implosion guard (24).
7. Clean the baseplate (15): use the method in Step 5. If necessary, use a mild abrasive (such as 3M Scotchbright).
8. Clean the chamber lid (1): use the method in Step 5.
9. If necessary, use glass-bead blasting to clean components in the chamber. Alternatively, use a mild abrasive cleaner to clean the components.
10. Refer to Figure 5. If a crystal holder accessory is fitted (see Section 3.6)
  - Check that the electrical plug (9) is securely fitted to the electrical socket (8) on the baseplate.
  - Check that the plug (1) is securely fitted to the socket on the Crystal Holder (2).
11. Inspect all the electrical connectors in the chamber and check that they are not loose. Tighten any loose connections.
12. Inspect all the electrical cables and wires in the chamber and check that they are not damaged and have not overheated. Replace any damaged or overheated cables or wires.
13. Refer to Figure 6. Refit the implosion guard (24) and secure with the retaining screw (22).
14. Inspect the chamber glass gaskets (21, 27). If they are damaged or have deteriorated, you must replace them. If they are not damaged, use a clean, lint-free cloth to clean the gaskets.
15. Refit the gaskets (21, 27) to the chamber glass (23), then refit the chamber glass to the baseplate (15).

## CONTENTS

Section	Title	Page
1	INTRODUCTION	1
1.1	Scope and definitions	1
2	OPERATION	1
2.1	Introduction	1
2.1.1	Sequence of operation	2
2.1.2	Timer operation	2
2.1.3	Determine the optimum settings for your process	4
2.2	Replace or change the sputter target	6
2.3	Prepare the Scancoat	8
2.4	Coat SEM samples (with the timer)	9
2.5	Coat SEM samples (without the timer)	10
2.6	Sputter etch/clean samples	10
2.7	Coat metallurgical samples with interference films	11

## Illustrations

Figure	Title	Page
1	Timer controls and displays	3
2	Scancoat controls and indicators	5
3	The Scancoat chamber	7



1. Chamber lid
2. Electrode insulator
3. Upper collar
4. 'O' ring
5. 'O' ring
6. 'O' ring
7. Insulator
8. Magnet
9. Electrode assembly

10. Copper cathode
11. Gold target
12. Centre screen securing screws
13. Centre screen
14. Shield ring
15. Baseplate
16. 'O' ring
17. Lower collar
18. Worktable insulator

19. Worktable
20. Specimen holder
21. 'L' gasket (lower)
22. Screw
23. Chamber glass
24. Implosion guard
25. Shield assembly
26. Counter-sunk screw
27. 'L' gasket (upper)
28. Anode gap: 1 to 2 mm

Figure 6 - Scancoat chamber

4.4 **Inspect the pipelines and connections**

1. Inspect your cooling-water supply and return pipelines and connections and check for leaks, corrosion and damage. Seal any leaks found and repair or replace components as necessary.
2. Inspect the process gas pipeline and connections and check for leaks, corrosion and damage. Seal any leaks found and repair or replace components as necessary.
3. If you have fitted a vent gas supply pipeline, inspect the vent gas pipeline and connections and check for leaks, corrosion and damage. Seal any leaks found and repair or replace components as necessary.
4. Inspect the vacuum pipe and connections and check for leaks, corrosion and damage. Seal any leaks found. If the vacuum pipe is corroded or damaged, contact your supplier or BOC Edwards for advice.
5. Inspect the electrical supply cables and connections and check that they have not overheated and are not damaged. If any cable or connection has overheated or is damaged, contact your supplier or BOC Edwards for advice.

4.5 **Reset a circuit breaker**

Refer to Figure 1. The Power circuit breaker switch (12) and the HT circuit breaker switch (11) are normally in the 'on' position. When a circuit breaker trips, the corresponding switch reverts to the 'off' position.

You must only reset a circuit breaker and continue to use the Scancoat if you have identified and rectified the cause of the trip. To reset the circuit breaker, move the corresponding switch to the 'on' position again.

4.6 **Fault finding**

4.6.1 **General**

*Note: If you have made all of the checks described in Tables 5 and 6 and you cannot rectify a fault, or if you cannot identify the cause of a fault, the Scancoat may be faulty; contact your supplier or BOC Edwards for advice.*

Refer to Table 5 for general fault finding. When required, refer to Section 4.6.2 to identify the possible causes of leaks.

# Instruction Manual

## Scancoat Six Sputter Coater

### Volume 2 - Operating Instructions

Description	Item Number
Scancoat Six Sputter Coater, 230 V, 1-phase, 50 Hz	E096-01-000
Scancoat Six Sputter Coater, 230 V, 1-phase, 60 Hz	E096-02-000

#### Supplementary Publications

RV Rotary Vane Pumps	A652-01-880
Piranhi Gauge Heads	D024-22-883
ISI6K Vacuum Interlock Switch	D059-14-880
Piranhi 501/502	D395-02-880
IPVA10EK Air Admittance Valves	C417-01-885



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Symptom	Check	Action
None of the switches have any effect and none of the lamps go on.	Has the power circuit breaker tripped ?  Is the external electrical supply correct ?  Is the electrical supply cable disconnected from the Scancoat or the electrical supply ?	Check the power circuit breaker switch and reset if necessary.  Ensure that the external electrical supply is switched on, and is the correct voltage and frequency. Ensure that the electrical supply cable is correctly fitted to the Scancoat and to the external electrical supply.
The rotary pump does not start.	Is the pump-oil too viscous ?  Is the electrical supply connection faulty ?  Is the pump switched on ?	If the temperature where the pump is installed is too low, the oil will be too viscous for correct operation of the pump. If possible, move the Scancoat and pump to a different operating location, or install suitable space heaters. Ensure that the electrical supply cable is correctly fitted to the pump and to the connector on the Scancoat. Ensure that the switch on the pump is in the 'on' position.
The performance of the rotary pump is poor: you cannot reduce the chamber pressure, or it takes a long time to reduce the chamber pressure.	Is the pump oil contaminated ?  Is there a leak into the system ?  Is there excessive moisture in the chamber ?  Is there excessive out-gassing in the chamber ?	Open the gas-ballast control to decontaminate the pump oil: refer to the pump instruction manual. Check for leaks and seal any leak found: refer to Section 4.6.2. Inspect the chamber and clean the chamber and any components in the chamber. Inspect the materials in the chamber; replace any materials which will significantly outgas during pump-down.
The HT supply does not go on when selected.	Has the HT circuit breaker tripped ?  Is the chamber pressure too high ?	Check the HT circuit breaker switch and reset if necessary. If the Interlock lamp is not on, the pressure in the chamber is too high. Wait until the pressure in the chamber is correct.
The HT circuit breaker trips continuously, or the HT is on, but there is no glow discharge.	Is there a short circuit on the electrode or the workholder assembly ?	Ensure that there are no short circuits on the electrode and workholder assembly.
The vacuum gauge shows incorrect pressures (the rotary pump is also poor).	Is the pressure display faulty because of a leak into the system ?  Is the pressure display faulty because of excessive moisture in the chamber ?	Check for leaks and seal any leak found: refer to Section 4.6.2.  Inspect the chamber and clean the chamber and any components in the chamber.

Table 5 - Fault finding

## Causes of leaks

If you suspect that there is a leak into the system, investigate the possible causes of a leak as shown in Table 6.

Possible cause	Action
The vacuum pipeline connections are loose.	Inspect the connections and tighten as necessary.
The vacuum pipeline is damaged.	Inspect the vacuum pipeline; if it is damaged, you must replace it. Contact your supplier or BOC Edwards.
There is dirt or debris under the chamber 'L' gaskets.	Inspect the gaskets and clean as necessary.
The chamber 'L' gaskets are damaged.	Inspect the gaskets; if they are damaged or have deteriorated (for example, they have undergone thermal set), you must replace them: refer to Section 6.3.
The chamber lid is not correctly located on the top of the chamber.	Inspect the chamber lid and check that it is centrally located on the chamber, and that it is not loose. Contact your supplier or BOC Edwards if there is a problem with the lid.
A seal is damaged or incorrectly fitted.	Contact your supplier or BOC Edwards.
The process gas control valve is obstructed or damaged, or the electrical connections to the valve are faulty.	Contact your supplier or BOC Edwards.
The vent valve is obstructed or damaged, or the electrical connections to the valve are faulty.	Contact your supplier or BOC Edwards.

Table 6 - Possible causes of leaks

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## 5

### STORAGE AND DISPOSAL

#### 5.1

##### Storage

###### WARNING

Use suitable lifting equipment, or get someone to help you move the Scancoat. The Scancoat is heavy and may cause injury or be damaged if it is dropped. Refer to Section 2 for the mass of the Scancoat.

Use the following procedure to store the Scancoat:

1. Shut down the Scancoat as described in Volume 2.
2. Disconnect the Scancoat (and any accessories fitted) from the electrical supply.
3. Refer to Figure 2. Disconnect the process gas supply pipeline from the process gas inlet (4) on the Scancoat.
4. Disconnect the vacuum pipeline from the vacuum pump connector (7) on the Scancoat.
5. Disconnect the cooling-water supply and return pipelines from the connectors (8, 9) on the Scancoat and allow the cooling-water to drain from the Scancoat.
6. Clean the chamber: refer to Section 4.3.
7. Store the Scancoat and the rotary pump in cool, dry conditions until required for use. When required, install the Scancoat and the rotary pump as described in Section 3.

#### 5.2

##### Disposal

Dispose of the Scancoat, the rotary pump and any components in accordance with all local and national safety and environmental requirements:

- Take particular care with components and waste oil which have been contaminated with dangerous process substances.
- Do not incinerate 'O' rings.

## 6 SERVICE, SPARES AND ACCESSORIES

### 6.1 Introduction

BOC Edwards products, spares and accessories are available from BOC Edwards companies in Belgium, Brazil, China, France, Germany, Israel, Italy, Japan, Korea, Singapore, United Kingdom, U.S.A and a world-wide network of distributors. The majority of these centres employ service engineers who have undergone comprehensive BOC Edwards training courses.

Order spare parts and accessories from your nearest BOC Edwards company or distributor. When you order, please state for each part required:

- Model and Item Number of your equipment.
- Serial number (if any).
- Item Number and description of part.

### 6.2 Service

BOC Edwards products are supported by a world-wide network of BOC Edwards Service Centres. Each Service Centre offers a wide range of options including equipment decontamination; service exchange; repair; rebuild and testing to factory specifications. Equipment which has been serviced, repaired or rebuilt is returned with a full warranty.

Your local Service Centre can also provide BOC Edwards engineers to support on-site maintenance, service or repair of your equipment.

For more information about service options, contact your nearest Service Centre or other BOC Edwards company.

### 6.3 Spares

Note: Refer to the manuals supplied as Supplementary Publications for other spares.

Spare	Item Number
Cathodes	
Gold cathode	E096-01-042
Platinum cathode	E087-32-000
Gold /palladium cathode	E087-33-000
Iron cathode	E087-34-000
Copper cathode	E087-12-072
Chamber seals (2 required)	
Nitrile	E001-00-202
Fluoroelastomer	D157-01-042
Glass chamber	E087-03-047
Spare crystals (packet of 5)	E086-68-000

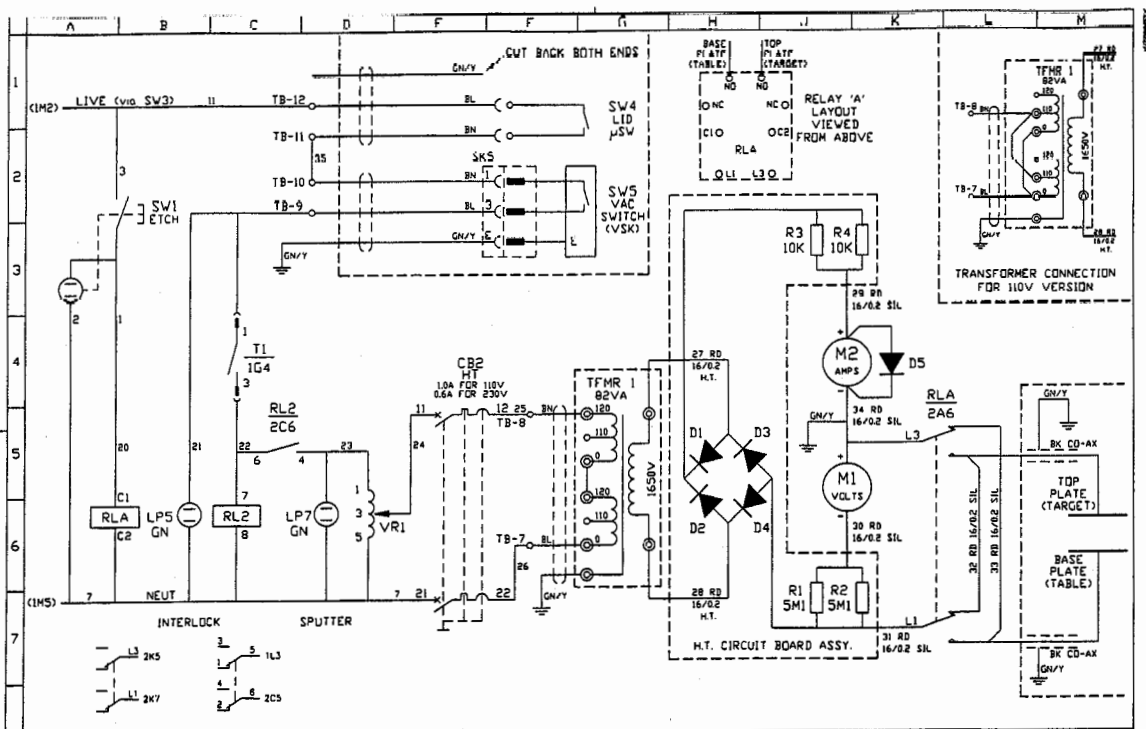


Figure 7 - Circuit diagram: sheet 2 of 2

Item Number	Spare
H026-00-050	Activated alumina
H026-00-056	0.45 kg
H110-25-015	0.2 kg
E096-01-300	Rotary pump oil
E096-02-300	Spares Kit
	230 V electrical supply
	115 V electrical supply

#### 6.4.1 Carbon fibre evaporation accessory

Use the carbon evaporation accessory to deposit carbon when you manufacture support films and replicas. The carbon evaporation accessory can only be used to evaporate in the downwards direction. The carbon fibre is held between two spring clamps, to enable short lengths of carbon fibre to be used. The carbon fibre can be outgassed before evaporation, to prevent the production of large particles during evaporation. A manual shutter prevents heat damage to delicate specimens during outgassing of the carbon fibre.

Carbon fibre evaporation accessory, 230 V, 50 Hz	E096-01-200
Carbon fibre evaporation accessory, 115 V, 60 Hz	E096-02-200

**Fit the shutter accessory so that:**

- Material removed from samples during etching is not deposited onto the target, and so re-deposited onto the sample.
- A target, especially a reactive target such as iron, may be sputter cleaned without deposition onto samples.

**Item Number**  
E087-41-000

Use the metallurgical sample holder to hold standard samples, embedded in moulded plastic cylinders. This method is commonly used to hold metal samples, so that they can be polished. Note that moulded plastic cylinders are not supplied with the Metallurgical sample holder.

**Item Number**  
**E087-42-000**



6.4.4 Oil mist filter

Fit the oil mist filter to the RV3 Rotary Vacuum Pump outlet to prevent the discharge of rotary pump oil vapours and odour into the local atmosphere. The amount of oil that has accumulated in the filter is visible through the sight panel on the filter body. A drain plug is provided for you to drain oil from the filter.

Accessory	Item Number
Oil mist filter	A462-26-000

6.4.5 Film thickness monitor

You must use the FTM6 in conjunction with a Crystal Holder accessory (see Section 6.4.7), a crystal and an Oscillator unit (see section 6.4.8). The FTM6 Film thickness monitor measures and displays the thickness of films deposited in the Scancoat vacuum chamber. The film thickness display on the FTM6 automatically shows the correct thickness unit: nm (nanometres) or  $\mu\text{m}$  (micrometres).

Accessory	Item Number
FTM6 Film thickness monitor	E086-64-000

6.4.6 Crystal Holder

Fit the Crystal Holder in the Scancoat chamber and use it in conjunction with a crystal, the Oscillator unit (see Section 6.4.8) and the film thickness monitor (see Section 6.4.6) to monitor the rate and thickness of deposition from a deposition source.

Accessory	Item Number
Crystal holder	E096-01-400

6.4.7 Oscillator Unit and Connecting Cable

The Oscillator Unit is used by the film thickness monitor, FTM6, to measure the thickness of films deposited in the Scancoat vacuum chamber (see Section 6.4.6).

Accessory	Item Number
Oscillator and connecting cable	E086-66-000

7 ENGINEERING DIAGRAMS

The electrical circuit diagram for the Scancoat is shown in Figure 7.